इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”
Mazdoor Kisan Shakti Sangathan
“The Right to Information, The Right to Live”

“पुराने को छोड नये के तरफ”
Jawaharlal Nehru
“Step Out From the Old to the New”

IS 13736-3-6 (1993): Classification of environmental conditions, Part 3: Classification of groups of environmental parameters and their severities, Section 6: Ship environment [LITD 1: Environmental Testing Procedure]

“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”
Bhartṛhari—Nītiśatakam
“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE

BRUTUM FULMEN
IGNORANTIA JURIS NON EXCUSAT
PROTECTED BY COPYRIGHT

REAFFIRMED
2003

IS 13736 (Part 3/Sec 6) : 1993
IEC Pub 721-3-6 (1987)

भारतीय मानक

पर्यावरण अवस्थाओं का वर्गीकरण

भाग 3 पर्यावरण पेरामीटर और उनकी कठोरताओं के समूहों का वर्गीकरण

अनुभाग 6 जहाज पर्यावरण

Indian Standard

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 6 Ship Environment

UDC 621·38·038 : 620·193 : 629·12

© BIS 1993

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 1993 Price Group 5

Environmental Testing Procedures Sectional Committee, LT 02

NATIONAL FOREWORD

This Indian Standard, which is identical with IEC Pub 721-3-6 (1987) 'Classification of environmental conditions — Part 3 : Classification of groups of environmental parameters and their severities — Ship environment', issued by the International Electrotechnical Commission, was adopted by the Bureau of Indian Standards on the recommendation of the Environmental Testing Procedures Sectional Committee (LT 02) and approval of the Electronics and Telecommunication Division Council.

The text of the IEC standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not indentical to those used in Indian Standards. Attention is particularly drawn to the following:

> Wherever the words 'Internatianal Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

The concerned technical committee has reviewed the provisions of IEC 92-101 (1980), IEC 92-502 (1980), IEC 721-1 (1981), IEC 721-2-1 (1982) and IEC 721-3-0 (1984), referred in this standard and has decided that they are acceptable for use in conjunction with this standard.

Part 1 of this Indian Standard deals with classification of environmental parameters and their severities. The subsequent parts are intended to deal with the following:

a) Environmental conditions appearing in nature.

b) Classification of groups of environmental parameters and their severities.

Only the English language text in the International Standard has been retained while adopting it in this Indian Standard.

AMENDMENT NO. 1 SEPTEMBER 1999
TO
IS 13736 (PART 3/SEC 6) : 1993/IEC PUB 721-3-6 (1987) CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

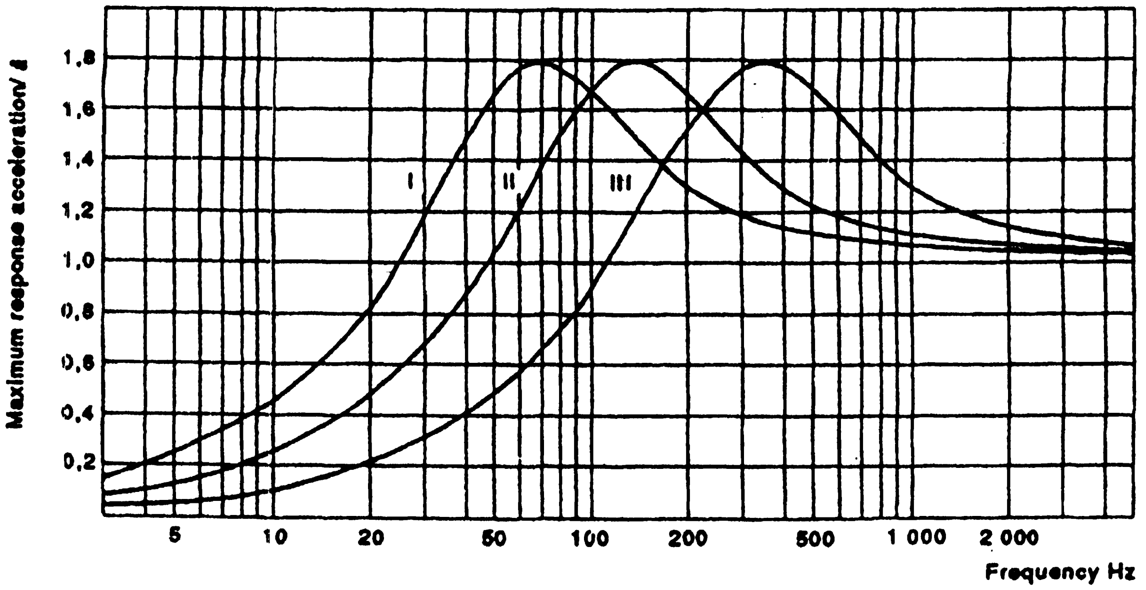
PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 6 Ship Environment

[This Amendment No. 1 is based on Amendment No. 1 to IEC 721-3-6 (1987). The page numbers mentioned in this Amendment refer to the IEC Page No. given in the standard.]

Page 19 (Page 7 of IS 13736 (Part 3/Sec 6) : 1993)

Replace figure 1 by the following:



Example of durations for half-sine pulse:

Spectrum type I: duration 11 ms
Spectrum type II: duration 6 ms
Spectrum type III: duration 2,9 ms

Figure 1 - Model shock response spectra (first order maximax shock response spectra). For explanation see note 6 relating to table I of IEC 721-1 (1990)

(LTD 2)

Reprography Unit, BIS, New Delhi, India

IS 13736 (Part 3/Sec 6) : 1993
IEC Pub 721-3-6 (1987)

AMENDMENT NO. 2 SEPTEMBER 1999
TO
IS 13736 (PART 3/SEC 6) : 1993/IEC PUB 721-3-6 (1987) CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 6 Ship Environment

[This Amendment No. 2 is based on Amendment No. 2 to IEC 721-3-6 (1987). The page numbers mentioned in this Amendment refer to the IEC Page No. given in the standard.]

Page 9 [Page 2 of IS 13736 (Part 3/Sec 6) : 1993]

4 Classification of groups of environmental parameters and their severities

Add, after the first paragraph, the following new paragraph:

Climatic conditions in tropical areas as specified in classes 6K6 and 6K7 are explained in annex B.

Page 11 [Page 3 of IS 13736 (Part 3/Sec 6) : 1993]

Table I – Classification of climatic conditions

Add columns 6K6 and 6K7 as follows (columns "Environmental parameter" and "Unit" are repeated for information only):

Environmental parameter	Unit	Class	
		6K6 [6]	6K7 [6]
a) Low temperature, air	°C	+5	–20
b) Low temperature, water	°C	+15	+15
c) High temperature, air	°C	+55	+70
d) High temperature, surfaces [4]	°C	+70	+70
e) High temperature, water	°C	+35	+35
f) Gradual change of temperature, air/air	°C °C/min	+5/+40 3	–20/+40 3
g) Change of temperature, air/water	°C	+40/+15	+40/+15
h) Humidity, not combined with rapid temperature changes	% °C	95 +35	95 +45
i) Humidity, combined with rapid temperature changes, air/air at high relative humidities	% °C	95 +5/30	95 –20/+35
j) Humidity, combined with rapid temperature changes, air/air at high water content [5]	g/m³ °C	60 +55/+15	60 +70/+15
k) Low relative humidity	% °C	10 +30	10 +30
l) Movement of surrounding medium, air	m/s	50	50
m) Precipitation, rain	mm/min	15	15
n) Radiation, solar	W/m²	1120	1120
o) Radiation, heat	W/m²	1200	1200
p) Water from sources other than rain	m/s	10	10
q) Wetness	None	Wet surfaces	

Add note 6:

[6] Further information on classes 6K6 (tropical damp) and 6K7 (tropical dry) is given in annex B.

Price Group 1

Indian Standard

CLASSIFICATION OF ENVIRONMENTAL CONDITIONS

PART 3 CLASSIFICATION OF GROUPS OF ENVIRONMENTAL PARAMETERS AND THEIR SEVERITIES

Section 6 Ship Environment

1. Scope

This part of the standard classifies groups of environmental parameters and their severities to which a product is subjected when installed aboard a ship. Ships where products may be permanently or temporarily installed include:

- ships propelled by mechanical means, including mobile offshore units;
- ships not propelled by mechanical means, including sailing boats and life rafts.

The classes defined apply to all sizes of ships from pleasure craft to trawlers, ferry boats, icebreakers, cargo ships including tankers.

The areas in which ships normally navigate are:

- inland waterways (canals, rivers, lakes);
- coastal waters;
- oceans.

Areas where ships have to navigate in ice are also included.

The environmental condition classification given in this standard applies to products which are installed for the running, handling and safety of the ship. It may also be used for other products installed in a similar way and in the same locations.

Accidental incidents are not included, but the possibility of their occurrence may need to be taken into account for products vital to the safety of the ship.

The classification does not cover the effect of water pressure on submerged products.

For the use of the classified environmental parameters and their severities in ships propelled by mechanical means, see the environmental conditions specification in IEC Publication 92-101.

Classifications of storage and transportation environmental conditions are given in other parts of IEC Publication 721-3.

2. Object

To classify groups of environmental parameters and their severities to which a product will be exposed under its conditions of use when installed aboard ships.

A limited number of classes of environmental parameters and their severities is laid down covering a broad field of applications. The user of this standard should select the lowest class necessary for covering the conditions of the intended use.

3. General

For further general guidance, see IEC Publication 721-3-0.

The severities given are those which will have a low probability of being exceeded. Only severe conditions which may affect the structural integrity or functional performance of a product are included.

Depending on the local situation there may be different frequencies of occurrence related to a certain period of time. Such frequencies of occurrence should be considered for any environmental parameter. They should additionally be specified if applicable. Information on duration and frequency of occurrence is given in Amendment No. 1 to IEC Publication 721-3-0 as Clause 6.

4. Classification of groups of environmental parameters and their severities

A limited number of classes for climatic conditions (K), biological conditions (B), chemically active substances (C), mechanically active substances (S), and mechanical conditions (M) are given in Tables I, II, III, IV and V. For a given product, reference should be made to the total set of classes, for example: 6K3 / 6B1 / 6C2 / 6S1 / 6M3.

The combination of the lowest classes 6K1 / 6B1 / 6C1 / 6S1 / 6M1 forms the condition to which a product will be subjected when installed only in totally weatherprotected locations aboard ships not propelled by mechanical means. The combination of the highest classes 6K5 / 6B2 / 6C3 / 6S3 / 6M4 covers a wide number of installations aboard most types of ships including locations with very severe conditions.

A class of conditions normally includes classes with lower severity digits. For certain parameters it has not yet been possible to give quantitative severities.

A summary of conditions covered by the classes is given in Appendix A.

TABLE I

Classification of climatic conditions

Environmental parameter	Unit	Class				
		6K1	6K2	6K3	6K4	6K5
a) Low temperature, air	°C	+5	−25	−25[1]	−25	−40[2]
b) Low temperature, water	°C	Freezing point of water[3]				
c) High temperature, air	°C	+40	+40	+55	+70	+70
d) High temperature, surfaces[4]	°C	None	None	None	+70	+70
e) High temperature, water	°C	+30	+35	+35	+35	+35
f) Gradual change of temperature, air/air	°C °C/min	None	−25/+20 1	−25/+40 3[1]	−25/+40 3	−25/+40 3
g) Change of temperature, air/water	°C	None	None	None	+40/+5	+40/+5
h) Humidity, not combined with rapid temperature changes	% °C	95 +30	95 +35	95 +35	95 +45	95 +45
i) Humidity, combined with rapid temperature changes, air/air at high relative humidities	% °C	None	None	95 −25/+35	95 −25/+35	95 −25/+35
j) Humidity, combined with rapid temperature changes, air/air at high water content[5]	g/m³ °C	None	None	None	60 +70/+15	60 +70/+15
k) Low relative humidity	% °C	10 +30	10 +30	10 +30	10 +30	10 +30
l) Movement of surrounding medium, air	m/s	Negligible	Negligible	Negligible	30	50
m) Precipitation, rain	mm/min	None	None	None	6	15
n) Radiation, solar	W/m²	Negligible	700	700	1120	1120
o) Radiation, heat	W/m²	Negligible	600	1200	1200	1200
p) Water from sources other than rain	m/s	None	0.3	0.3	3	10
q) Wetness	None	No	Wet surfaces			

[1] A number of products located in machinery spaces are only required to operate after a period of warm-up of the machinery spaces. For these products the low temperature for operation is +5 °C, and the gradual change of temperature condition only applies to the non-operational state.

[2] Ships will normally not navigate when air temperatures are below −40 °C. Products may, however, be left unprotected on ships which are temporarily laid up in harbour for the coldest period of the year. In such cases products in the non-operational state, may have to withstand temperatures down to −55 °C. In exceptional cases in inland waters, ships may also navigate when temperatures are below −40 °C.

[3] Freezing point may be lower than 0 °C due to presence of salt or pollution, etc.

[4] Surface temperatures refer to hot parts to which the products may be attached. More extreme surface temperatures can exist, for instance on machines, and may have to be considered.

[5] The product is assumed to be subjected to a rapid decrease of temperature only (no rapid increase). The figures of water content apply to temperatures down to the dew point; at lower temperatures the relative humidity is assumed to be approximately 100%.

TABLE II

Classification of biological conditions

Environmental parameter	Unit	Class	
		6B1	6B2
a) Flora, in air	None	Negligible	Presence of mould, fungus, etc.
b) Fauna, in air	None	Negligible	Presence of rodents and other animals harmful to products

Note. – Externally installed products on submerged parts of the hull will be subjected to flora and fauna of the water (algae, crustations, corals).

TABLE III

Classification of chemically active substances

Environmental parameter	Unit	Class		
		6C1	6C2	6C3
Substances in air:[1] [2] *a) Salt mist*	None	No	Yes[3]	Yes[3]
b) Sulphur dioxide	mg/m^3 cm^3/m^3	0.1 0.037	1.0 0.37	1.0 0.37
c) Hydrogen sulphide	mg/m^3 cm^3/m^3	0.01 0.0071	0.5 0.36	0.5 0.36
d) Nitrogen oxides (expressed in the equivalent values of nitrogen dioxide)	mg/m^3 cm^3/m^3	0.1 0.052	1.0 0.52	1.0 0.52
e) Ozone	mg/m^3 cm^3/m^3	0.01 0.005	0.01 0.005	0.1 0.05
f) Hydrogen chloride	mg/m^3 cm^3/m^3	0.1 0.066	0.1 0.066	0.5 0.33
g) Hydrogen fluoride	mg/m^3 cm^3/m^3	0.003 0.0036	0.003 0.0036	0.03 0.036
h) Ammonia	mg/m^3 cm^3/m^3	0.3 0.42	0.3 0.42	3.0 4.2
Substances in water:[4] *i) Sea salts*	kg/m^3	Negligible	Negligible	30

[1] Other substances and severities may occur due to a specific cargo carried. For tankers, reference is made to IEC Publication 92-502.

[2] Explosive atmosphere is outside the scope of this standard and therefore not included.

[3] No values at present.

[4] Substances in water other than sea salts are not included, as they are considered to have a negligible effect on electrotechnical products already protected from the effect of sea salts.

TABLE IV

Classification of mechanically active substances

Environmental parameter	Unit	Class		
		6S1	6S2	6S3
a) Sand in air	g/m^3	None	0.1	10
b) Dust sedimentation	mg/(m^2 · h)	Negligible	3.0	3.0
c) Soot deposit	None	None	Presence of soot	

Notes 1. – Other severities of dust and sand may occur due to specific cargoes, containing dusty material and sand (including abrasive substances). The distribution of particle size and chemical composition is important as well as the quantity of the particles. (No values at present.)

2. – In machinery spaces, droplets of oil may be present in the air. A concentration of 3 mg/m^3 air may occur. Higher concentrations up to 20 mg/m^3 air may be present close to diesel engines, or in oil separator rooms.

TABLE V

Classification of mechanical conditions

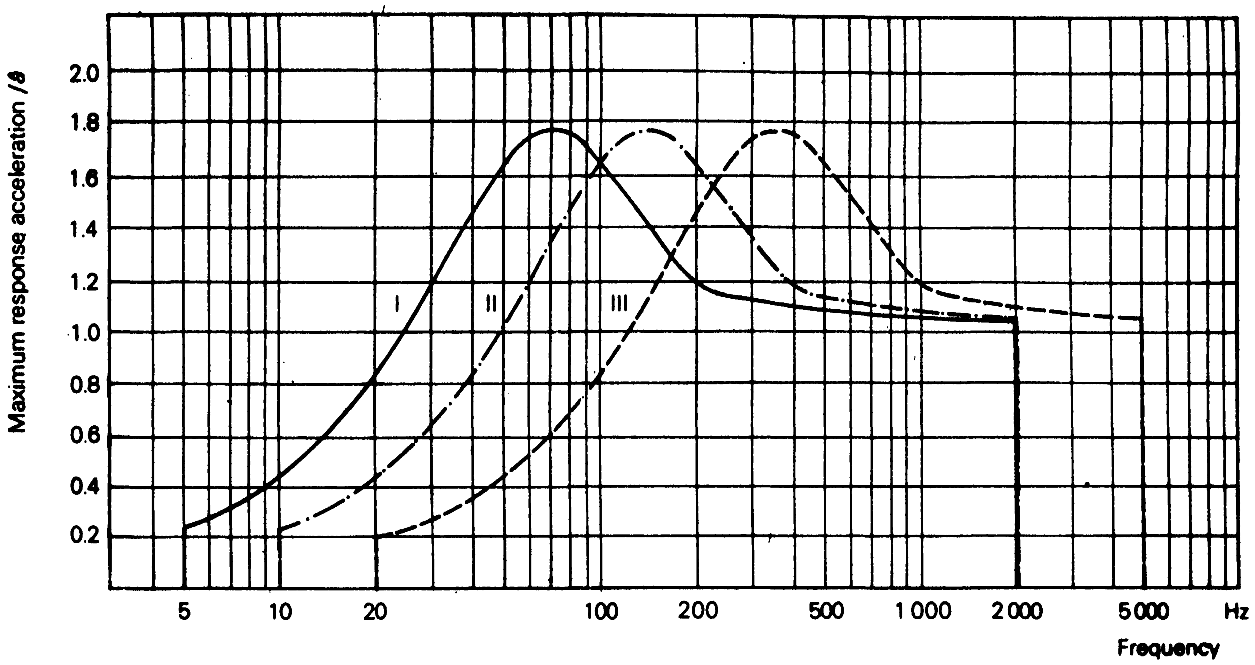
Environmental parameter	Unit	Class			
		6M1	6M2	6M3	6M4
a) Stationary vibration, sinusoidal:[1]					
displacement amplitude	mm	None	1.5	1.5	1.5
acceleration amplitude	m/s^2	None	10	20	50
frequency range	Hz	None	2–13 13–100	2–18 18–200	2–28 28–200
b) Non-stationary vibration, including shock:[2]					
shock response spectrum type I					
peak acceleration $\hat{a}$	m/s^2	50	100	100	100
shock response spectrum type II					
peak acceleration $\hat{a}$	m/s^2	100	300	300	300
shock response spectrum type III					
peak acceleration $\hat{a}$	m/s^2	None	None	500	500
c) Angular deviation, static condition:[3]					
rotation around X-axis (list)					
angle	degree	15	15	15	15
rotation around Y-axis (trim)					
angle	degree	10	10	10	10
d) Angular motion, dynamic condition:[3]					
rotation around X-axis (roll)					
angle	degree	22.5	22.5	22.5	22.5
frequency	Hz	0.14	0.14	0.14	0.14
rotation around Y-axis (pitch)					
angle	degree	10	10	10	10
frequency	Hz	0.2	0.2	0.2	0.2
rotation around Z-axis (yaw)					
angle	degree	4	4	4	4
frequency	Hz	0.05	0.05	0.05	0.05
e) Steady-state acceleration:[3]					
X-direction (surge)	m/s^2	5	5	5	5
Y-direction (sway)	m/s^2	6	6	6	6
Z-direction (heave)	m/s^2	10	10	10	10

[1] Vibration generated by conventional ship engines is mainly of a sinusoidal nature with a pronounced low frequency content. High frequency vibration up to 2000 Hz and of intensities up to 50 m/s^2 will, however, be present in icebreakers. Random vibration is also present in ships due to forces produced in the contact between the hull or propeller and the water. The levels are normally low, and therefore random vibration has not been included.

[2] Shock units are peak acceleration ($\hat{a}$). Shock response spectra are illustrated in Figure 1, page 19. For explanation see Sub-clause 5.3 of IEC Publication 721-1.

[3] The three orthogonal axes related to the ship are:

X = fore and aft
Y = athwart
Z = vertical



Example of durations for half-sine pulse:

Spectrum type I: Duration = 11 ms
Spectrum type II: Duration = 6 ms
Spectrum type III: Duration = 2.3 ms

FIG. 1. – Model shock response spectra
(first order maximax shock response spectra).

APPENDIX A

SUMMARY OF CONDITIONS COVERED BY THE CLASSES

A1. General

In this appendix a number of conditions are referred to as covered by each class. Where applicable, reference is also made to the types of climate covered.

A survey of conditions affecting the choice of environmental parameters and their severitie will be found in Clause 8 of the future fourth edition of IEC Publication 92-101.

The types of climate are defined in IEC Publication 721-2-1 and include:

Cold
Cold Temperate
Warm Temperate
Warm Dry
Mild Warm Dry
Warm Damp
Warm Damp, Equable

It should be noted that, if a certain condition referred to in this appendix is covered by certain class, it does not necessarily mean that the class describes, for each single parameter the lowest environmental severity needed to cover the condition.

Note: – The most extreme types of climate in IEC Publication 721-2-1, Extremely Cold and Extremely Warm Dry can normally only be found in inland areas, and have therefore been exluded here. It should be noted however, that ships may be subjected to these types of climate during inland navigation (on rivers, lakes etc.), although this can be regarded as being very exceptional.

A2. K. Climatic conditions

These are covered by five class notations as follows:

6K1 6K1 covers products installed in totally weatherprotected, heated and ventilate locations after warm-up, excluding machinery spaces and locations containing equip- ment dissipating considerable heat. The product is not exposed to solar radiatio through glass or other transparent materials. 6K1 does not cover the Warm Damp an Warm Damp, Equable Types of Climate.

6K1 also includes submerged products in all areas except those with particularly hig water temperature, for example, the Arabian Gulf.

6K2 In addition to the conditions covered by 6K1, 6K2 covers heated and ventilate locations except machinery spaces, before and during warm-up in all Types of Climat except Cold.

For ventilated locations 6K2 also covers Warm Damp and Warm Damp, Equable Type of Climate.

The products may be subjected to wetness, to heat radiation from heating elements an to solar radiation through glass or other transparent materials.

6K2 also includes submerged products in areas with particularly high water tempera ture.

6K3 In addition to the conditions covered by 6K2, 6K3 covers products placed in machinery spaces as well as in close proximity to equipment dissipating considerable heat.

6K3 also covers products placed close to gates, ramps, etc., which are opened temporarily for loading and unloading.

6K4 In addition to the conditions covered by 6K3, 6K4 covers conditions in non-ventilated locations, which are subjected to solar radiation, rain and water jets except in the Type of Climate Cold. It also covers non-weatherprotected products in all Types of Climate except Cold, but not in areas with abnormal rain intensities and hurricanes.

The product may also be subjected to direct solar radiation and water jets but not to heavy seas.

6K4 also covers products placed in machinery spaces mounted to hot parts of machinery.

6K5 In addition to the conditions covered by 6K4, 6K5 covers products installed in unheated weatherprotected locations and in non-weatherprotected locations in the Type of Climate Cold. It also covers products in refrigerated cargo spaces as well as in non-weatherprotected locations in ships operating in areas with abnormal rain intensities and hurricanes and products subjected to heavy seas.

A3. B. Biological conditions

These are covered by two class notations as follows:

6B1 6B1 covers installations in ships operating in areas without particular risks of attacks from flora or fauna. It also covers other ships where the installations are located in compartments of such construction that mould growth and attacks by animals are not likely.

6B2 In addition to the conditions covered by 6B1, 6B2 includes non-protected installations in ships operating in areas where mould growth and attacks by animals may occur.

A4 C. Chemically active substances

These are covered by three class notations as follows:

6C1 6C1 covers totally weatherprotected installations which are not subjected to salt mist, engine exhausts or emissions from nearby industrial sources. It also covers conditions on decks (protected from engine exhaust) in ships confined to inland fresh waters and not operating close to industries with considerable air polluting emissions.

6C2 In addition to the conditions covered by 6C1, 6C2 covers totally weatherprotected installations which are subjected to salt mist and to engine exhausts.

6C3 In addition to the conditions covered by 6C2, 6C3 covers non-weatherprotected installations. It also covers conditions in ships operating close to industries with considerable air polluting emissions.

A5. **S. Mechanically active substances**

These are covered by three class notations as follows:

6S1 6S1 covers installations protected from sand, dust and ingress of soot.

6S2 In addition to the conditions covered by 6S1, 6S2 covers installations, both weatherprotected and non-weatherprotected where sweeping of dusty decks may take place. It also covers locations subject to emissions from boiler exhausts (soot).

6S3 In addition to the conditions covered by 6S2, 6S3 covers non-weatherprotected installations, including those in ships operating close to sand deserts.

A6. **M. Mechanical conditions**

These are covered by four class notations as follows:

6M1 6M1 covers installations in ships which are not powered by engines.

6M2 In addition to the conditions covered by 6M1, 6M2 covers installations in engine-powered ships larger than 1 000 metric tons dead weight except for stern locations in ships smaller than 20 000 metric tons dead weight.

6M2 does not cover products connected directly to loading systems or to reciprocating types of machinery.

6M3 In addition to the conditions covered by 6M2, 6M3 also covers installations in ships smaller than 1 000 metric tons dead weight and in stern locations of ships smaller than 20 000 metric tons dead weight.

Products connected directly to loading systems, container guides, cranes and installations in dredgers are also included.

6M4 In addition to the conditions covered by 6M3, 6M4 covers products connected directly to reciprocating types of machinery.

Printed at Dee Kay Printers, New Delhi-110015, India

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the ***Bureau of Indian Standards Act*, 1986** to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS

Revision of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indin Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No LTD 02 (0023)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 11002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
Common to all Offices)

Regional Offices :	**Telephone**
Central : **Manak Bhavan, 9 Bahadur Shah Zafar Marg** NEW DELHI 110002	**331 01 31** **331 13 75**
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	**37 84 99, 37 85 61** **37 86 26, 37 86 62**
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43, 53 16 40 53 23 84
Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	632 92 95, 632 78 58 632 78, 91, 632 78 92

Branch : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD, GUWAHATI. HYDERABAD. JAIPUR. KANPUR LUCKNOW. PATNA. THIRUVANANTHAPURAM.

Printed at Printwell Printers, Aligarh, India